

## **RACT – Background for Rule Development**

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### **Overview**

The 1990 Clean Air Act (CAA) per section 172(c)(1) requires implementation of reasonably available control measures (RACM) for VOC and NO<sub>x</sub> emissions as expeditiously as practicable to attain ozone standards which includes, at a minimum, the adoption of a reasonably available control technology (RACT) program for major sources in ozone non-attainment areas.

The State has already implemented both VOC and NO<sub>x</sub> rules to meet previous CAA requirements. In 1979 counties in southeast Wisconsin were initially designated by EPA as non-attainment for the 1 hour ozone standard. At that time the CAA required Wisconsin to implement RACT rules only on major sources of VOC emissions. The state continues to review and update the VOC RACT rules and requirements since their initial implementation.

In 1990 the CAA was modified to include the additional requirement of RACT for major sources of NO<sub>x</sub> emissions in the non-attainment areas. However, it was determined that local NO<sub>x</sub> RACT reductions would result in an ozone dis-benefit to Wisconsin non-attainment areas. Therefore, EPA granted a waiver from implementation of NO<sub>x</sub> RACT in Wisconsin 1-hour non-attainment counties. However, NO<sub>x</sub> controls were still required to the extent they showed benefit for rate of progress (steady declining emissions) and 1-hour attainment. Wisconsin met this requirement with the NR 428 NO<sub>x</sub> control program adopted in February of 2001. The NR 428 program focused solely on reductions necessary for demonstrating attainment of the 1-hour standard by 2007 and did not represent a NO<sub>x</sub> RACT program for existing sources.

The current applicability of NO<sub>x</sub> RACT is the result of ten southeast Wisconsin counties being designated in June of 2004 as non-attainment for the newly adopted Federal 8-hour ozone air quality standard. Our current analyses of chemical transport modeling results indicate that the NO<sub>x</sub> waiver is no longer warranted. The change in the form of the ozone standard to a longer averaging period (8 hours) shifted our ozone control focus from reducing local VOC concentrations to controlling regional NO<sub>x</sub> emissions.

Therefore, with the NO<sub>x</sub> Waiver no longer applicable, the CAA requires adoption of a RACT program by September of 2006 with controls in place by the ozone season of 2009.

## Premise for Developing a RACT Program

- To meet the basic CAA and state requirements for a RACT program based on a current analysis of controls specific to Wisconsin sources.
- The proposed RACT rule is not anticipated to demonstrate attainment. A RACM requirement will likely be evaluated in pursuant rule development through 2007. The development of this requirement may identify reductions beyond RACT and additional affected sources.
- The CAA requires NOx reductions to be implemented as “expeditiously” as practicable for demonstrating attainment.

## Applicability and Requirements

Rule adoption: September 2006

Compliance deadline: Ozone Season 2009

“Moderate” non-attainment counties:

- The counties of Kenosha, Racine, Milwaukee, Waukesha, Washington, Ozaukee, and Sheboygan are designated “moderate” non-attainment.
- A major source in a moderate non-attainment area is defined as a unit with the potential to emit 100 tons of NOx per year.

“Basic” non-attainment:

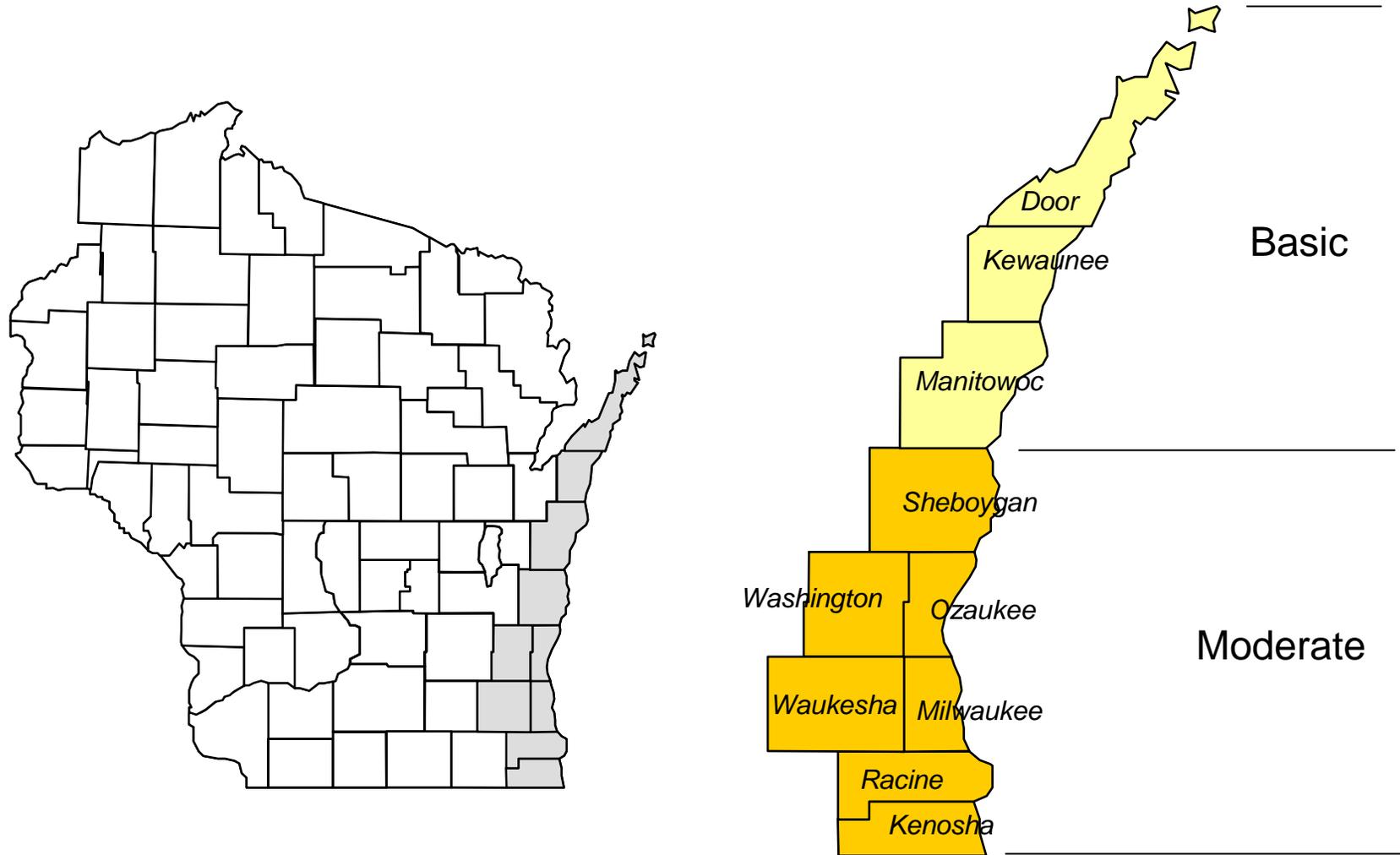
- The counties of Manitowoc, Kewaunee, and Door are designated “Basic” non-attainment.
- The CAA requires RACT in the “Basic” counties only if an extension for demonstrating attainment is requested beyond the 2009 ozone season.
- If RACT is required a major source is the same as in the “Moderate” counties or defined as a unit with the potential to emit 100 tons of NOx per year.

## RACT Level of Control

- CAA definition of RACT – Available and cost-effective
- What is “Available” – General history of source sector control applications and review of source and equipment vendor information.
- What is Cost-Effective?
  - a. Cost of past VOC RACT reductions has been upwards of \$10,000 per ton.
  - b. Cost compared to past NOx installations.
  - c. Point of diminishing return
- The department will perform an analysis by source category of control and cost specific to Wisconsin sources.

## **RACT – Geography and Designation**

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## **RACT – Potentially Affected Source Categories**

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An initial screening is being conducted to identify potentially RACT affected major sources in the moderate and basic non-attainment counties. The analysis indicates that only combustion sources above a certain threshold are potentially classified as NO<sub>x</sub> Major Sources under the RACT requirement. A summary of this screening analysis is provided in Table 1.

The screening analysis relies primarily on information reported annually by sources to the DNR 2002 air emission inventory. As a next step this information must be reviewed with the sources for accuracy and actual conditions.

A major source in both the Moderate and Basic non-attainment areas is defined as a unit with the potential to emit 100 tons of NO<sub>x</sub> per year. Several approaches are used to identify the units with this potential. First, a typical capacity or size threshold is identified for the source category with the potential to emit 100 TPY based on typical source category emission rates from AP-42 Compilation of air emission rates. The maximum capacity rating or maximum fuel consumption rate in the air emissions inventory is used to calculate a comparable threshold value. Second, the potential to emit is calculated based directly on the maximum fuel capacity and emission rates entered into the air emissions inventory. And, the actual reported emissions are screened as a last check. A significant number of sources utilize a primary fuel and other fuels as necessary. In some cases the unit potentially emits more than 100 TPY based one of the secondary fuels.

The screening analysis is believed to be a conservative estimate of the number of potentially affected sources. There is a relatively high confidence in the estimate for the boiler, combustion turbine, and lime kiln source categories. However, in other source categories the information typically reported to the air emission inventory is less accurate in determining maximum capacities and emissions. When it is not clear a unit is assumed to be affected. Potential major sources in the process heating and reciprocating engines source categories are identified by as those reporting actual emissions of 10 TPY or more. It is assumed that these units would be operating at no less than 10% of the unit's capacity to yield a surrogate potential to emit of 100 TPY.

It also appears common for multiple units to be reported as a single source which when disaggregated will fall below the 100 TPY threshold. For this and the afore mentioned reasons fewer units are expected to be subject to RACT than those identified by the analysis particularly for the source categories of asphalt plants, furnaces, process heating, and reciprocating engines.

**Table 1. Summary of Source Categories and Number of Emission Units Potentially Classified as a Major Source (WDNR 3/27/06)**

Source Category	Capacity Threshold	Moderate O3 Area			Basic O3 Area			Total O3 Area		
		No. of Units	Annual NOx	Season NOx	No. of Units	Annual NOx	Season NOx	No. of Units	Annual NOx	Season NOx
Boilers										
EGU Coal*	All	13	40,054	19,035	4	846	360	17	40,900	19,395
ICI Coal	All	3	277	122				3	277	122
Natural Gas	100 mmbtu/hr	11	144	61				11	144	61
Distillate Oil	100 mmbtu/hr	2	0.3	0.1				2	0	0
Residual Oil	63 mmbtu/hr				2	40	6	2	40	6
EGU Turbines*	All	18	152	87	1	6	3	19	158	90
Lime Kiln	All				2	145	57	2	145	57
Asphalt Plants**	50 - 75 mmbtu/hr	28	110	72	1	8	5	29	118	77
Furnaces**	100 mmbtu/hr	23	210	2	2	10	0	25	220	2
Process Heating***	75 - 100 mmbtu/hr	5	130	40				5	130	40
Reciprocating Engines***	500 - 750 Hp	20	900	490	2	24	14	22	924	504
<b>Total</b>		<b>123</b>	<b>41,977</b>	<b>19,910</b>	<b>14</b>	<b>1,079</b>	<b>445</b>	<b>137</b>	<b>43,056</b>	<b>20,355</b>

\* Based on EPA Acid Rain 2002 Emissions data

\*\* The number of affected sources is expected to be significantly less than that estimated in the table.

\*\*\*Estimated number of units and emissions based on assuming units emitting 10 tons per year or greater. Numbers in parenthesis represents total for the sector.

## **RACT – Proposed Rule Framework**

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The proposed rule framework establishes emission rate limitations effective on a unit-by-unit basis for specific source categories.

**Compliance Date** – Ozone season 2008 to demonstrate SIP reductions and ozone season 2009 for source compliance.

### **Affected Sources and Geography**

- RACT is applicable in “Moderate” non-attainment counties
- RACT will be applicable in “Basic” non-attainment counties only if an attainment date extension, beyond 2009, is requested for the Basic areas.

### **Unit-by-Unit Requirement**

Compliance with emission rates and requirements will be on a unit by unit basis. The emission limitations are expressed on a 30 day rolling average. These requirements are similar in structure to the current NR 428 NOx control program effective in the 1-hour ozone non-attainment counties. The proposed rule could provide the ability for a source to request and an alternative emission limit based on a case specific RACT determination.

### **Annual and Ozone Season Emission Limits**

Although the CAA RACT requirement is established for ozone attainment, RACT programs have been established on an annual basis in order to realize the full benefit of the installed control equipment. An annual and seasonal emission limit will be proposed to potentially address technical issues related to long term versus short-term reductions while still ensuring appropriate reductions during the ozone season.

### **Monitoring Requirement**

- EGUs will be required to use PART 75 continuous emissions monitoring (current monitoring)
- Non-EGUs will be required to use PART 60 continuous emissions monitoring or equivalent.

**Trading Provision** – A trading program will be established which allows averaging of units in the same source category on a facility basis only. Refer to the document concerning BART and RACT Trading Program for specific details.

- Requires a mass cap on all units in the same source category at a facility to avoid capacity switching. Exemptions can be identified for auxiliary or emergency equipment.
- Mass cap is based on historic actual emissions or fuel consumption with application of the proposed BART, RACT, or any other NOx requirement to each individual unit.
- Part 75 monitoring is required for all units at a facility (EPA’s typical mass based monitoring requirement).
- Facility based averaging has several advantages: surety of emission reductions for SIP purposes, simple to implement and administer, provides corporate utilization of facility resources.

**RACT – Proposed Emission Limitations****WDNR, 03/14/06**

Source Category	Unit Threshold	Annual Limitation	Ozone Season Limitation
Boilers:			
Solid Fuel-Fired	=> 250 mmbtu/hr	0.09 lbs/mmbtu	0.07 lbs/mmbtu
Solid Fuel-Fired	< 250 mmbtu/hr	0.25 lbs/mmbtu	0.20 lbs/mmbtu
Natural Gas	100 mmbtu/hr	0.10 lbs/mmbtu	0.07 lbs/mmbtu
Distillate Oil	100 mmbtu/hr	0.12 lbs/mmbtu	0.10 lbs/mmbtu
Residual Oil	60 mmbtu/hr	0.20 lbs/mmbtu	0.15 lbs/mmbtu
Lime Kiln Natural Gas Distillate Oil Residual Oil Coal	50 mmbtu/hr	0.10 lbs/mmbtu 0.12 lbs/mmbtu 0.20 lbs/mmbtu 0.60 lbs/mmbtu	0.10 lbs/mmbtu 0.12 lbs/mmbtu 0.20 lbs/mmbtu 0.60 lbs/mmbtu
Glass Furnace	100 mmbtu/hr	0.10 lbs/mmbtu	0.07 lbs/mmbtu
Metal Reheat, Annealing, and Galvanizing Furnaces	100 mmbtu/hr	0.10 lbs/mmbtu	0.07 lbs/mmbtu
Asphalt Plants Natural Gas Distillate Oil Residual Oil or Waste Oil	75 mmbtu/hr	0.15 lbs/mmbtu 0.20 lbs/mmbtu 0.27 lbs/mmbtu	0.15 lbs/mmbtu 0.20 lbs/mmbtu 0.27 lbs/mmbtu
Process Heating Units Natural Gas Distillate Oil	50 mmbtu/hr	0.10 lbs/mmbtu 0.12 lbs/mmbtu	0.07 lbs/mmbtu 0.10 lbs/mmbtu
Combustion Turbine Natural Gas Distillate Oil Biogas	25 MW	25 ppmdv @ 15% O2 65 ppmdv @ 15% O2 35 ppmdv @ 15% O2	25 ppmdv @ 15% O2 65 ppmdv @ 15% O2 35 ppmdv @ 15% O2
Reciprocating Engine Rich-burn units Lean-burn units Distillate-fuel Natural Gas / Dual fuel	500 hp	9.5 gr/bhp-hr 10 gr/bhp-hr 8.5 gr/bhp-hr 6.0 gr/bhp-hr	9.5 gr/bhp-hr 10 gr/bhp-hr 8.5 gr/bhp-hr 6.0 gr/bhp-hr

Footnote – All emission limits are based on a 30 day rolling average.

**RACT – Extending Attainment Date beyond 2009****WDNR, 03/14/06**

Requesting an extension to the ozone attainment compliance date beyond 2009 implements additional RACT requirements. The major source threshold is lowered from 100 TPY to 50 TPY for the moderate counties. The basic counties retain the same initial designation, but RACT is applicable. The smaller sources (between 50 and 100 tons) were originally subject to RACM with compliance in 2009. Therefore becoming subject to RACT is anticipated to result in no change in the likely required level of control in 2009.

Compliance Date – The compliance date for RACT remains the ozone season 2009. However, the RACM compliance deadline for remaining RACM sources is “expeditiously as possible” through to the new attainment date of 2012.

Moderate Counties

- Moderate re-designated to Serious.
- RACT threshold is lowered from 100 to 50 tpy.
- RACT level of control is likely similar to previous RACM level of control.
- RACT compliance date is same as previous RACM compliance date.

Basic Counties

- Basic counties remain designated Basic
- RACT for major sources at 100 tpy.
- RACT is defined as control necessary to demonstrate attainment (same as RACM).
- RACT compliance date remains same as previous RACM compliance date.

**Table 3. Summary of Additional Sources Potentially Classified as a Major Sources Based on a 50 TPY Threshold.**

Source Category	Capacity Threshold	Moderate O3 Area		
		No. of Units	Annual NOx	Season NOx
<b>Boilers</b>				
EGU Coal*	All			
ICI Coal	All			
Natural Gas	75 mmbtu/hr	13	35	14
Distillate Oil	70 mmbtu/hr			
Residual Oil	30 mmbtu/hr	1	0.5	0.1
EGU Turbines*	All			
Lime Kiln	All			
Asphalt Plants**	50 - 75 mmbtu/hr			
Furnaces**	75 mmbtu/hr	5	43	ND
Process Heating***	50 - 75 mmbtu/hr	6	36	ND
Reciprocating Engines***	250 - 500 Hp	12	98	ND
<b>Total</b>		<b>37</b>	<b>213</b>	<b>14</b>

ND = not determined